DL06 I/O Specifications

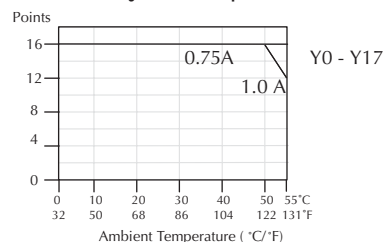## D0-06DD2-D   <--->

Wiring diagram and specifications

D0-06DD2-D Specifications		
DC Power Supply Specifications	**Voltage Range**	12-24VDC (15W)
DC Input Specifications	**Number of Input Pts.**	20 (sink/source)
	Number of Commons	5 (isolated)
	Input Voltage Range	12-24VDC
	Input Impedance	(X0-X3) 1.8K @ 12-24VDC (X4-X23) 2.8K @ 12-24VDC
	On Current/ Voltage Level	5mA/>10VDC
	OFF Current/ Voltage Level	0.5mA/<2VDC
	Response Time	X0-X3	X4-X23
	OFF to ON Response	<70µS	2-8mS Typ. 4mS
	ON to OFF Response	<70µS	2-8mS Typ. 4mS
	Fuses	None
DC Output Specifications	**Number of Output Points**	16 (sourcing)
	Number of Commons	4 isolated
	Output Voltage Range	10.8-26.4VDC
	Peak Voltage	30VDC
	Max.Frequency (Y0,Y1)	10kHz
	ON Voltage Drop	0.5VDC @ 1A (Y0-Y1) 1.2VDC @ 1A (Y2-Y17)
	Maximum Current	0.5A / point (Y0-Y1)* 1.0A / point (Y2-Y17)
	Maximum Leakage Current	15µ @ 30VDC
	Maximum Inrush Current	2A for 100ms
	OFF to ON Response	<10µS
	ON to OFF Response	<20µS (Y0-Y1) <0.50mS (Y2-Y17)
	External DC Power Required	N/A
	Status Indicators	Logic side
	Fuses	None (external recommended)

*When Y0-Y1 are not used for pulse outputs, maximum current output is 1.0A.

Power input wiring

Output point wiring

12 - 24 VDC

+24 VDC

OUTPUT: Sinking Output   6 - 27V   1.0A   PWR: 12-24   20W

D0-06DD2-D

INPUT: 12 - 24V   3 - 15mA

Direct LOGIC 06 Koyo

Input point wiring

DC Supply

Equivalent input circuit, High-speed inputs (X0-X3)

Equivalent input circuit, Standard inputs (X4-X23)

Equivalent output circuit Pulse output (Y0-Y1)

Equivalent output circuit Standard output (Y2-Y17)

Derating chart for DC outputs

Features at a Glance

The DL05 and DL06 micro PLCs are complete self-contained systems. The CPU, power supply, and I/O are all included inside the same housing. Option modules are available to expand the capability of each PLC family for more demanding applications. The standard features of these PLCs are extraordinary and compare favorably with larger and more expensive PLCs.

The specification tables to the right are meant for quick reference only. Detailed specifications and wiring information for each model of the DL05 and DL06 PLCs begin on page 2–33.

Program capacity

Most boolean ladder instructions require a single word of program memory. Other instructions, such as timers, counters, etc., require two or more words. Data is stored in V-memory in 16-bit registers.

Performance

The performance characteristics shown in the tables represent the amount of time required to read the inputs, solve the Relay Ladder Logic program and update the outputs.

Instructions

A complete list of instructions is available at the end of this section.

Communications

The DL05 and DL06 offer powerful communication features normally found only on more expensive PLCs.

Special features

The DC input and DC output PLCs offer high-speed counting or pulse output. Option module slots allow for discrete I/O expansion, analog I/O, or additional communication options.

DL05 CPU Specifications

System capacity
Total memory available (words)	6K
Ladder memory (words)	2,048
V-memory (words)	4,096
User V-memory	3,968
Non-volatile user V-memory	128
Battery backup	Yes[1]
Total built-in I/O	14
Inputs	8
Outputs	6
I/O expansion	Yes[1]

Performance
Contact execution (Boolean)	0.7µs
Typical scan (1K Boolean)[2]	1.5-3ms.

Instructions and diagnostics
RLL ladder style	Yes
RLLPLUS/flowchart style (Stages)	Yes/256
Run-time editing	Yes
Scan	Variable/fixed
Number of Instructions	133
Types of Instructions:	
Control relays	512
Timers	128
Counters	128
Immediate I/O	Yes
Subroutines	Yes
For/next loops	Yes
Timed interrupt	Yes
Integer math	Yes
Floating-point math	No
PID	Yes
Drum sequencers	Yes
Bit of word	Yes
ASCII print	Yes
Real-time clock/calendar	Yes[1]
Internal diagnostics	Yes
Password security	Yes
System and user error log	No

Communications
Built-in ports	Two RS-232C
Protocols supported:	
K-sequence (proprietary protocol)	Yes
DirectNet master/slave	Yes
Modbus RTU master/slave	Yes
ASCII out	Yes
Baud rate	
Port 1	9,600 baud (fixed)
Port 2	selectable 300-38,400 baud (default 9,600)

Specialty Features
Filtered inputs	Yes[3]
Interrupt input	Yes[3]
High speed counter	Yes, 5kHz[3]
Pulse output	Yes, 7kHz[3]
Pulse catch input	Yes[3]

1- These features are available with use of certain option modules. Option module specifications are located later in this section.

2- Our 1K program includes contacts, coils, and scan overhead. If you compare our products to others, make sure you include their scan overhead.

3- Input features only available on units with DC inputs and output features only available on units with DC outputs.

DL06 CPU Specifications

System capacity
Total memory available (words)	14.8K
Ladder memory (words)	7680
V-memory (words)	7616
User V-memory	7488
Non-volatile user V-memory	128
Built-in battery backup (D2-BAT-1)	Yes
Total I/O	36
Inputs	20
Outputs	16
I/O expansion	Yes[1]

Performance
Contact execution (Boolean)	0.6µs
Typical scan (1K Boolean)[2]	1-2ms.

Instructions and diagnostics
RLL ladder style	Yes
RLLPLUS/flowchart style (Stages)	Yes/1024
Run-time editing	Yes
Scan	Variable/fixed
Number of Instructions	229
Types of Instructions:	
Control relays	1024
Timers	256
Counters	128
Immediate I/O	Yes
Subroutines	Yes
For/next loops	Yes
Table functions	Yes
Timed interrupt	Yes
Integer math	Yes
Trigonometric functions	Yes
Floating-point math	Yes
PID	Yes
Drum sequencers	Yes
Bit of word	Yes
Number type conversion	Yes
ASCII in, out, print	Yes
LCD instruction	Yes
Real-time clock/calendar	Yes
Internal diagnostics	Yes
Password security	Yes
System and user error log	No

Communications
Built-in ports:	One RS-232C
	One multi-function RS232C/RS422/RS485

NOTE: RS485 is for MODBUS RTU only.

Protocols supported:	
K-sequence (proprietary protocol)	Yes
DirectNet master/slave	Yes
Modbus RTU master/slave	Yes
ASCII in/out	Yes
Baud rate	
Port 1	9,600 baud (fixed)
Port 2	selectable 300-38,400 baud (default 9,600)

Specialty Features
Filtered inputs	Yes[3]
Interrupt input	Yes[3]
High speed counter	Yes, 7kHz[3]
Pulse output	Yes, 10kHz[3]
Pulse catch input	Yes[3]

1- These features are available with use of certain option module. Option module specifications are located later in this section.
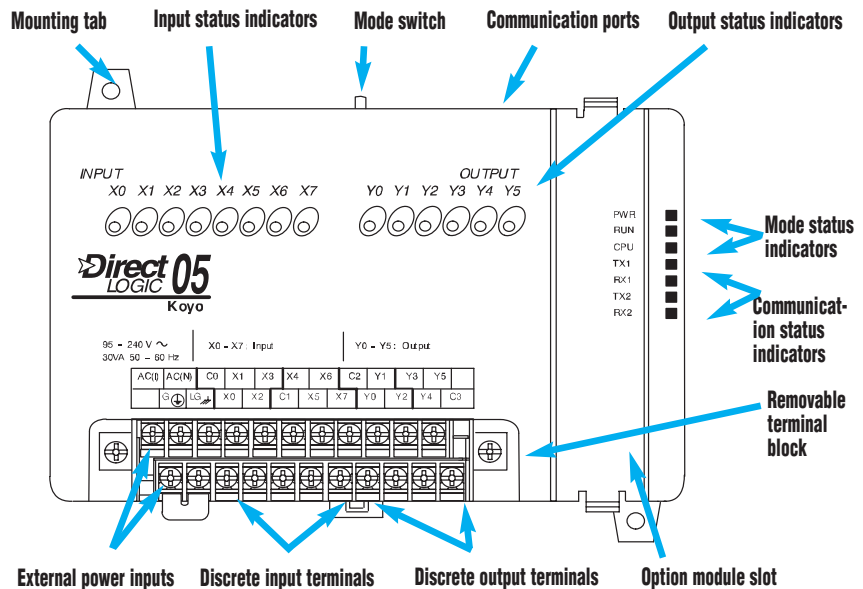
2- Our 1K program includes contacts, coils, and scan overhead. If you compare our products to others, make sure you include their scan overhead.

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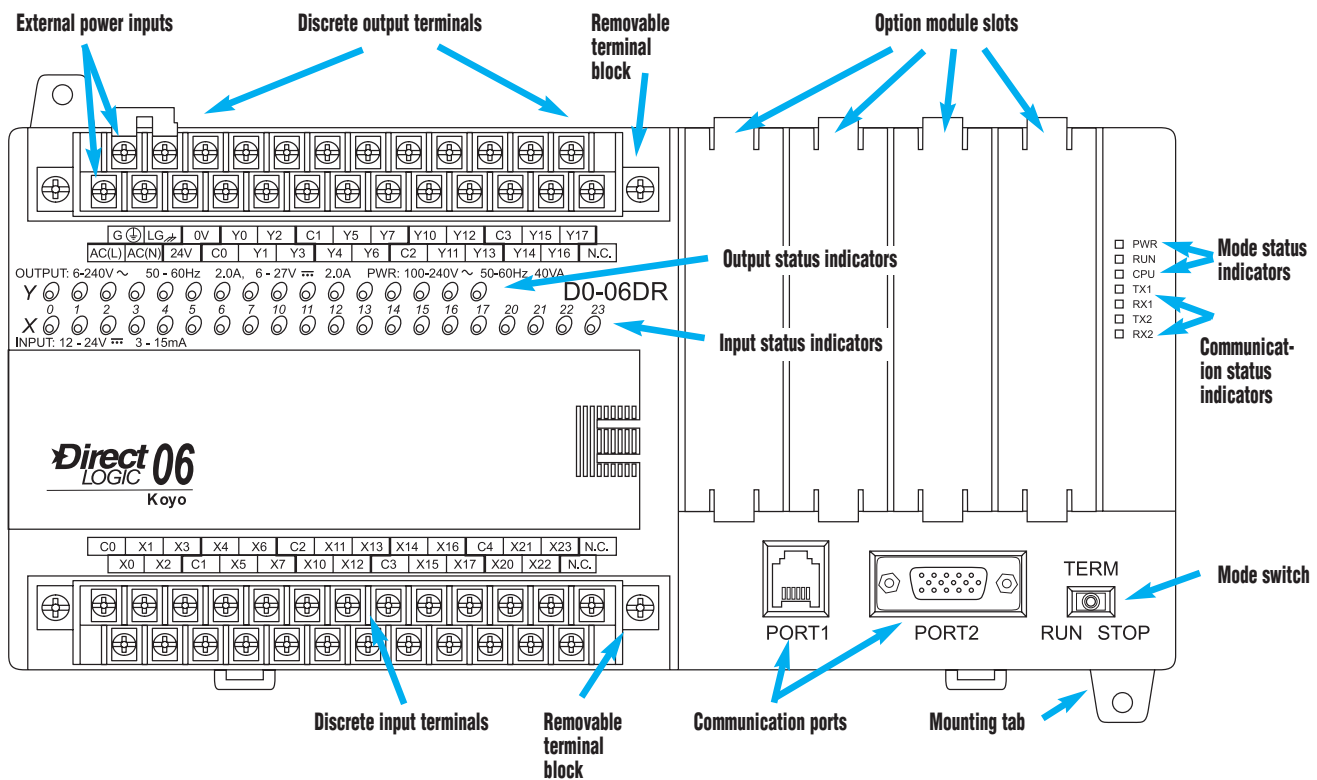
Features at a Glance

DirectSOFT software

The DL05 and DL06 PLCs use the same familiar *Direct*SOFT programming software that our larger PLCs use. We now offer a special FREE version of *Direct*SOFT which gives you all the great new features of the full version, but with a 100-word download restriction. For programs larger than 100 words, the full package is required. The FREE PC-DS100 software may be sufficient to program the DL05 and DL06. If you are programming with a full package version prior to v5.0, you will need v2.4 or later for the DL05 PLCs and v4.0 or later for the DL06. We always recommend the latest version for the most robust features.

Mounting tab · Input status indicators · Mode switch · Communication ports · Output status indicators · Mode status indicators · Communication status indicators · Removable terminal block · External power inputs · Discrete input terminals · Discrete output terminals · Option module slot

Hardware features diagrams

External power inputs · Discrete output terminals · Removable terminal block · Option module slots · Output status indicators · Mode status indicators · Input status indicators · Communication status indicators · D0-06DR · Discrete input terminals · Removable terminal block · Communication ports · PORT1 · PORT2 · TERM · RUN STOP · Mode switch · Mounting tab
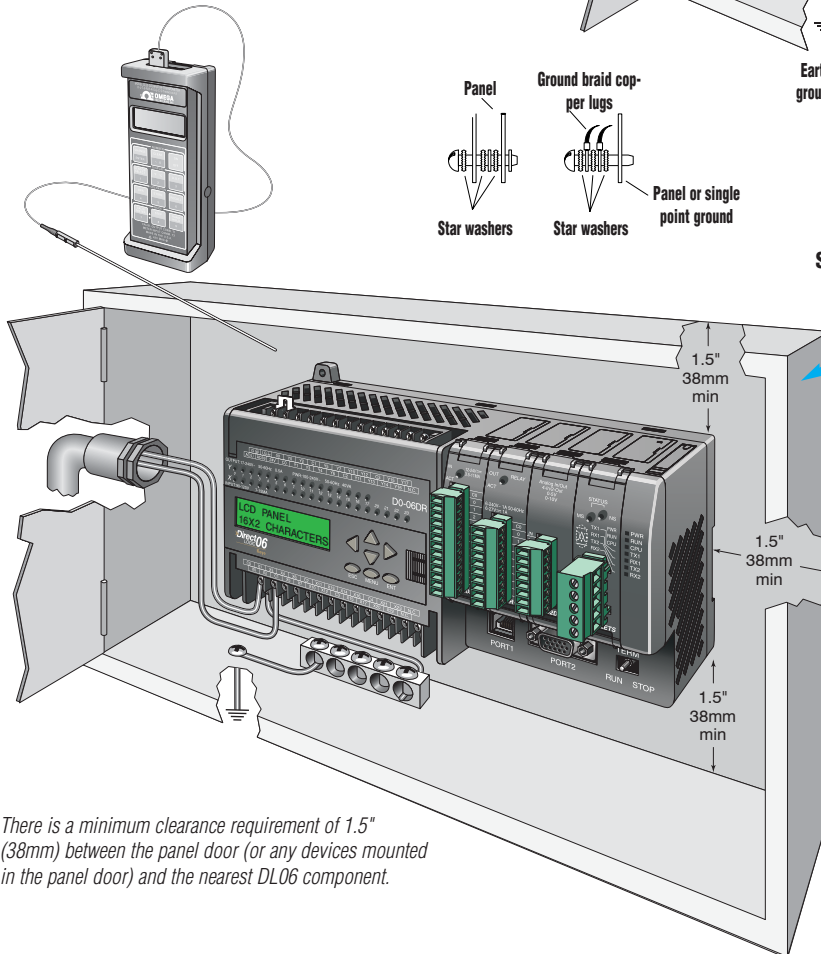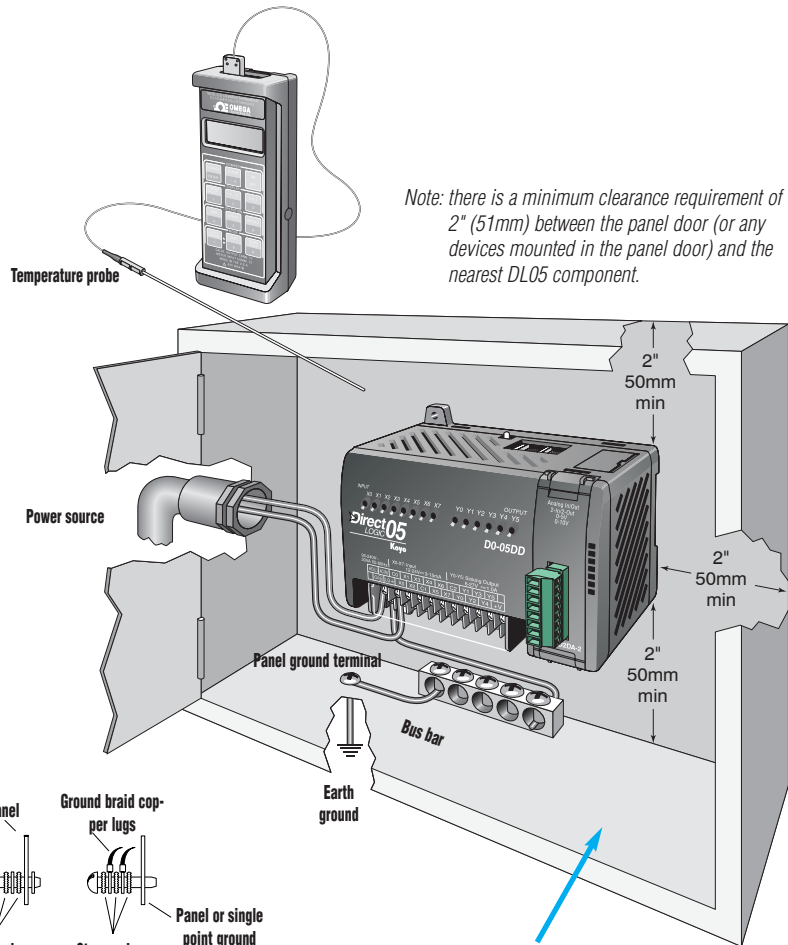
Product Dimensions and Installation

It is important to understand the installation requirements for your DL05 or DL06 system. Your knowledge of these requirements will help ensure that your system operates within its environmental and electrical limits.

Plan for safety

This catalog should never be used as a replacement for the user manual. You can purchase, download free, or view online the user manuals for these products. The D0-USER-M is the publication for the DL05 PLCs, and the D0-06USER-M is the publication for the DL06 PLCs. The D0-OPTIONS-M is the user manual for the option modules. These user manuals contain important safety information that must be followed. The system installation should comply with all appropriate electrical codes and standards.
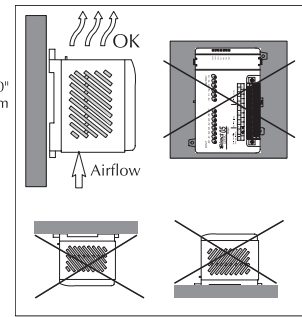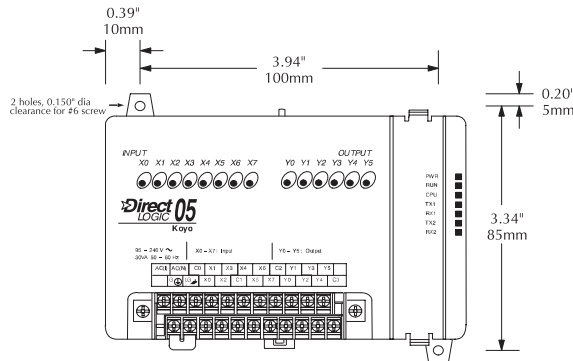
Note: there is a minimum clearance requirement of 2" (51mm) between the panel door (or any devices mounted in the panel door) and the nearest DL05 component.

Temperature probe

Power source

Panel ground terminal

2"
50mm
min

2"
50mm
min

2"
50mm
min

Bus bar

Earth ground

Panel

Ground braid copper lugs

Panel or single point ground

Star washers

Star washers

See the enclosure section of this desk reference to find an enclosure that fits your application.

1.5"
38mm
min

1.5"
38mm
min

1.5"
38mm
min

LCD PANEL
16X2 CHARACTERS

PORT1   PORT2   RUN   STOP

Note: There is a minimum clearance requirement of 1.5" (38mm) between the panel door (or any devices mounted in the panel door) and the nearest DL06 component.

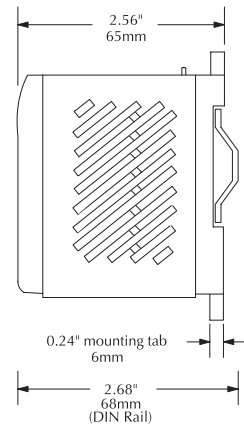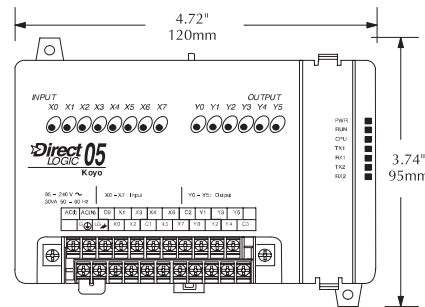| Environmental Specifications for DL05 and DL06	
Storage Temperature	-4º F-158ºF (-20ºC to 70ºC)
Ambient Operating Temperature	32ºF-131ºF (0º to 55ºC)
Ambient Humidity	5 to 95% relative humidity (non-condensing)
Vibration Resistance	MIL STD 810C Method 514.2
Shock Resistance	MIL STD 810C Method 516.2
Noise Immunity	NEMA (ICS3-304)
Atmosphere	No corrosive gases

Product Dimensions and Installation

Unit dimensions and mounting orientation

DL05 and DL06 PLCs must be mounted properly to ensure ample airflow for cooling purposes. It is important to follow the unit orientation requirements and to verify that the PLC's dimensions are compatible with your application. Notice particularly the grounding requirements and the recommended cabinet clearances.

Mounting orientation

Mounting orientation

PLC Overview

DL05/06 PLC

DL105 PLC

DL205 PLC

DL305 PLC

DL405 PLC

Field I/O

Software

C-more HMIs

Other HMI

AC Drives

Motors

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

TB's & Wiring

Power

Enclosures

Appendix

Part Index